

REMARKS

Claims 1-19 are pending in the present Application. Claim 12 has been canceled, claims 1 and 13 have been amended, Claims 16-19 have been withdrawn, and no claims have been added, leaving Claims 1-11 and 13-16 for consideration upon entry of the present Amendment.

Claim 1 has been amended to include the limitations of Claim 12, canceled herewith. In addition, Claim 13 has been amended to correctly depend from Claim 1. No new matter has been introduced by these amendments.

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

Claim Rejections Under 35 U.S.C. § 103(a)

Claim 1 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over U.S. Patent No. 4,071,369 (“Kurz”) in view of U.S. Patent No. 3,762,935 (“Leach”).

Claims 2-13 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Kurz in view of Leach as applied to claim 1 above, further in view of U.S. Patent No. 3,942,990 (“Engstrom”) as evidenced by EP 839 778.

In view of the above amendments to Claim 1 which includes herein the limitations of Claim 12, Applicants contest the rejection of amended Claim 1 based on the combination of Kurz in view of Leach and in further view of Engstrom as the primary rejection applied to Claim 12.

Kurz discloses a method for manufacturing porous ceramic products by mixing ceramic material which a fly dust containing silica and metal oxides and having a large specific surface area. In Kurz, it is described that the fly dust contains a high proportion (75-92%) of silica (SiO₂) and different metal oxides such as Al₂O₃, Fe₂O₃. In Example 2, 0.2 % by weight of SiC (silicon carbide) has been added as an oxidizing agent.

Leach discloses a foamed-in-place shaped article having high dimensional stability at extremes of heat and cold, good insulating properties, and high tensile strength. It is described that the composition for making the article comprises aluminum hydroxide, aluminum oxide, glass frit, bentonite, metal powder, and phosphoric acid.

Engstrom discloses a method for the manufacture of foamed ceramics from a starting composition containing (1) at least one waste product rich in silica and containing readily

oxidizable substances which, when heated, are themselves capable of producing uncontrollable pore formation and/or an undesirable melt, and (2) a strongly oxidizing agent. In the composition of Engstrom *et al.*, 0.1-0.5% pore-forming agent, e.g., silicon carbide may be used.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, or knowledge generally available in the art at the time of the invention, must provide some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). The obviousness inquiry also requires consideration of common knowledge and common sense. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1742-43 (2007); *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1367 (Fed. Cir. 2006) (“Our suggestion test is in actuality quite flexible and not only permits, but requires, consideration of common knowledge and common sense.”)

Regarding this claim rejection under 35 U.S.C. 103(a), Applicants note the following differences between the claimed invention and the cited references, Kurz, Leach, and Engstrom.

The amended claims are directed to a super light weight ceramic panel which comprises a multiplicity of closed pore structures produced by trapping carbon dioxide gas and oxygen gas, which is formed from a composition containing 90 to 98% by weight of an expandable clay mineral, 1 to 5% by weight of glass, and 0.5 to 5% by weight of silicon carbide (see Claim 1).

As described in the instant specification, conventional lightweight panels have many problems such as high water-permeability, excessive weight and low nail-bearing strength, and poor sound-insulation and flame retardancy. The super lightweight ceramic panel of the present invention overcomes these problems by formation of a closed pore structure in a ceramic panel, as achieved by the addition of glass *and silicon carbide* to expandable clay minerals. That is, the ceramic panel as claimed has closed cells so that it in turn has very low water permeability and good water resistance in addition to the intrinsic properties of the ceramic itself.

The characteristic features of the claimed invention are provided when the super lightweight ceramic panel is formed from a composition containing 0.5 to 5% by weight of

silicon carbide, 1 to 5% by weight of glass, and 90 to 98% by weight of an expandable clay mineral. In a ceramic panel prepared from this composition, the silicon carbide generates a gas within the vitreous phase formed by the glass (used as a flux), thereby resulting in formation of closed pore structures. The amount of silicon carbide is a very critical feature of the ceramic panel as claimed. As described in the instant specification, an excessive amount of silicon carbide leads to production of an excessively large amount of gas, which in turn reduces the density of the ceramic panel, resulting in formation of open pores from the closed pores, and which in turn allows the gas to be ejected to the outside, reducing the overall strength of the super lightweight ceramic panel. Table 2 in the instant specification clearly shows the importance of the amount of silicon carbide in the super lightweight ceramic panel of the subject invention.

Though Kurz discloses a porous ceramic products manufactured from a composition of ceramic material, a fly dust containing silica and metal oxide, and SiC as oxidizing agent, Kurz neither discloses, teaches, nor suggests the compositional limitations of amended instant Claim 1, useful for manufacturing the super lightweight ceramic panel, of 0.5 to 5% by weight of silicon carbide, 1 to 5% by weight of glass and 90 to 98% by weight of an expandable clay mineral. In particular, the composition of Kurz does not specify either the use of glass and the limitation of 0.5 to 5% by weight of silicon carbide. Leach discloses a foamed-in-place shaped article made from a composition containing glass frit, but neither describes nor suggests the limitations of 0.5 to 5% by weight of silicon carbide, 1 to 5% by weight of glass and 90 to 98% by weight of an expandable clay mineral. In addition Leach fails to disclose silicon carbide and therefore does not behave according to the same principle as Kurz. Thus, Kurz in view of Leach fails to disclose or teach all elements of the instant claims, and fails to provide a teaching or suggestion that would motivate one skilled in the art to combine Kurz and Leach to achieve the invention as claimed.

Finally, Engstrom discloses foamed ceramics manufactured from a composition containing a waste product rich in silica and 0.1-0.5% silicon carbide, but fails to teach or suggests the characteristic composition for manufacturing the super lightweight ceramic panel containing 0.5 to 5% by weight of silicon carbide, 1 to 5% by weight of glass and 90 to 98% by weight of an expandable clay mineral. In particular the composition of Engstrom does not contain glass and 0.5 to 5% by weight of silicon carbide. Engstrom fails to remedy the deficiencies of Kurz and Leach, and the combination neither anticipates nor renders obvious the subject invention.

The Examiner has further not provided a motivation that would lead one skilled in the art to combine Kurz, Leach, and Engstrom to provide a ceramic composition having closed cell structure containing glass, and the desired properties as claimed in the instant claims, and as disclosed in the instant specification. In making a Section 103 rejection, the Examiner bears the burden of establishing a *prima facie* case of obviousness. *In re Fine*, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1998). The Examiner “. . . can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in art would lead that individual to combine the relevant teachings of the references”. *Id.* The Examiner, in evidencing EP 0839778 (“EP’778”; Office Action, p. 3, top of page) as including the claimed components of the instant claims, has done just the opposite, as EP ’778 provides evidence thereby that the combination of quartzite and clay mineral, in the presence of a pore-forming ingredient, would be expected to provide an open-cell material (“interconnected fine porous structure”) useful for filtering, adsorbing and treating contaminants from wastewater, as disclosed in EP ’778. See p. 5, lines 15-23. There is thus no evidentiary basis for the Examiner’s assertion that one skilled in the art would be “motivated by the desire to facilitate the growth of individual foam cells which remain unconnected” by adding glass. (Office Action dated 10-15-07, p. 2, section 3, last full sentence) Further, as Kurz and Engstrom do not disclose the inclusion of glass in a closed cell composition, there can be no reasonable expectation that including the limitation of Leach would remedy this deficiency. *In re Laskowski*, 871 F.2d 115, 117, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989) (“Although the Commissioner suggests that [the structure in the primary art reference] could readily be modified to form the [claimed] structure, ‘[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification’”) (citation omitted); *In re Stencil*, 828 F.2d 751, 755, 4 U.S.P.Q.2d 1071, 1073 (Fed. Cir. 1987) (obviousness cannot be established “by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion that the combination be made”). There is no teaching or suggestions to combine elements of the prior art to produce the present invention.

In summary, neither Kurz nor Engstrom discloses or suggest the composition for manufacturing porous ceramics containing glass. Though Kurz and Engstrom disclose the composition containing silicon carbide, the amount disclosed differs from that of the subject

invention. As described in the above, 0.5 to 5% by weight of silicon carbide is the very critical point of the subject ceramic panel. Further, the composition of Leach for making a foamed-in-plate shaped article never contains silicon carbide, and no suggestion or incentive is presented that would lead one skilled in the art to combine each of these references to achieve a closed cell ceramic composition having the properties disclosed in the instant specification. Thus, the combination of Kurz, Leach and Engstrom fails to disclose all limitations of the instant claims, i.e., the amount of silicon carbide in the composition for the super lightweight ceramic panel, and the combination fails to teach or suggest the invention as claimed. Reconsideration and allowance of the claims is respectfully requested.

Claims 14-15 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Kurz in view of Leach as applied to claim 1 above, further in view of U.S. Patent No. 3,727,838 (“Bergh”). In addition, Claim 16 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Kurz in view of Leach, further in view of Romanian Patent No. RO 114015 (“RO ‘015”). Applicants respectfully traverse these rejections.

As described above, neither Kurz in view of Leach, nor Kurz in view of Leach and Engstrom, teaches or discloses all elements of the instant claims, and the combination fails to teach or suggest the invention as claimed. Thus, each of these rejections is moot, as Bergh and RO ‘015 each fail to remedy the deficiencies of Kurz and Leach, as the combinations of these fail to disclose or teach the composition of Claim 1. Accordingly, the combinations of Kurz in view of Leach in view of Bergh, and Kurz in view of Leach in view of RO ‘015, fail to render the instant claims unpatentable. Reconsideration and allowance of these claims (Claims 14-16) is respectfully requested

Therefore, the cited references, alone or in combination, fail to teach or disclose all limitations of the instant claims, and the combinations do not provide a teaching or suggestion that would motivate one skilled in the art to modify the references to provide the claimed invention.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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